

Fire Protection System in Educational Building

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Abstract: This paper aim is to study the fire safety norms in the educational building. The majority of the occupants in educational buildings are students and youths who easily panic, therefore installing a passive fire protection system (fire extinguisher, automatic sprinkler system, alarm system, etc.) and active fire protection (fire-resistant wall, staircase location) are the measure to prevent fire.

Keywords: Fire, Fire protection, NBC, IS code 1641.

1. Introduction

Fire occurs due to chemical reactions. Fire is a major hazard that occurs due to manmade causes. Fire causes losses of human life, structure, and losses to properties. Therefore, it is important the design the building according to fire norms. Fire protection means to prevent fire for the spread and protect the lives and property.

Classification of fire as per IS code

Class A – Ordinary combustibles or fibrous material such as wood, paper, cloth, rubber, and some plastics.

Class B – Flammable or combustible liquids such as gasoline, kerosene, paints, thinners, and propane.

Class C – gases.

Class D – Certain combustible metals, such as magnesium, titanium etc.

Class E – Energized electrical equipment, such as appliances, switches, panel boxes, and power tools.

Fire triangle:

The fire triangle consists of three things which should we present at the same time to produce fire.

The listed for component are:

- a) Heat
- b) Oxygen
- c) Fuel

2. FIRE PROTECTION SYSTEM

To prevent losses caused due to fire, fire protection system introduced. It involves techniques, installation, equipments for fire protection.

A. *Types of fire protection system*

1) *Passive fire protection system*

This is a type of fire protection system which is used to slow the spread of fire. Passive fire protection is material that is

always present within the building.

PFP methods

- a) Firewalls
- b) Fire doors
- c) Fire-resistant glasses
- d) Fire-resistant rated floor
- e) Fireproof cladding

2) *Active fire protection system*

This is also a type of fire protection system. There are two ways to control or extinguish the fire.

- a) Manual
- b) Automatic

Manual control methods include the use of the standpipe system and fire extinguisher.

The automatic control system includes a fire sprinkler system and a fire fighting foam system.

3. Firefighting equipment's

Different types of equipment for firefighting are:

- 1) Fire Extinguisher
- 2) Smoke detector System
- 3) Fire Alarm System
- 4) Hose reels
- 5) Automatic water sprinkler system
- 6) Fire Hydrants
- 7) Exit signs
- 8) Fire Bucket

Table 1
National Building Code of India-Part 4 volume 1 [2016]

	A	B
Types of Building Occupancy	Less Than 15m Height	15m And Above But Not Exceed 24
Fire Extinguisher	R	R
Hose Reel	R	R
Wet Riser	Nr	R
Automatic Sprinklers	R (Note)	R
Manual Operated Fire Alarm And Detector	Nr	R
Dry Riser	Nr	Nr
Terrace Tank	10000, 5000	25000
Ug Water	25000	Nr

Note – basement only

- The minimum of two staircases are provided if the height of the building is 15m or above. The staircase should be located in both the interior and exterior of the building and one of them should be open directly

to the exterior.

- The minimum width of the exit door shall be 1000mm and height of 2000mm.
- Proper ventilation shall be provided in all types of exits like staircase, lifts, and corridors.
- The material used for staircases, lobbies, and corridors shall be constructed of non-combustible material having a 2- hour resistant rating.
- Staircases shall not be arranged around a lift shaft.
- No gas piping or electrical panels shall pass through the staircase.
- The path of the staircase should be obstacle-free.
- The maximum length of the corridor is 45m.
- From inside of the building to outside of the building the travel distance should be a maximum 45m.

4. Conclusion

It is observed that buildings are designed according to the construction point of view. When these designs are compared with IS codes it is observed that norms are followed according to the construction point of view. But when these designs are compared with fire safety norms, it is cleared that fire safety norms were not considered in a building. This increases the chance of fire hazard taking place, which may cause severe damage to life and property. There is an intense need for applying fire and safety plans for life and property.

References

- [1] IS 1641-1988 code of practice for fire safety of building.
- [2] National building code of India part 4, Fire and Life Safety.
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